IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Before the Board of Patent Appeals and Interferences

In re the Application of

Inventor	**:**	**John Murkowski et al.**
Application No.	**:**	**10/597,536**
Filed	**:**	**July 28, 2006**
For	**:**	**DIAGNOSTIC ULTRASOUND SYSTEM WITH ARTICULATING FLAT PANEL DISPLAY**

APPEAL BRIEF

On Appeal from Group Art Unit 3768
Examiner Hien Ngoc Nguyen

W. Brinton Yorks, Jr.

US PHILIPS CORPORATION
22100 Bothell Everett Highway
Bothell, WA 98021
Phone: (425) 487-7152
Fax: (425) 487-8135
email: brint.yorks@philips.com

Attorney for Appellants

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W. Brinton Yorks, Jr.
Philips Electronics
22100 Bothell Everett Highway
P.O. Box 3003
Bothell, WA 98041-3003
(425) 487-7152
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I. REAL PARTY IN INTEREST

The real party in interest is Koninklijke Philips Electronics N.V., Eindhoven, The Netherlands by virtue of an assignment recorded July 28, 2006 at reel 018018, frame 0520.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

This application was originally filed with Claims 1-20. Claims 2, 5, and 15-20 have been canceled. Claims 1, 3, 4, and 6-14 were finally rejected by an Office Action mailed February 3, 2010. Applicants appealed this decision and, in response to applicants' appeal brief, the final rejection was withdrawn to add a further reference to the grounds of rejection. Claims 1, 3, 4, and 6-14 are the subject of this appeal of the final rejection of August 17, 2010.

IV. STATUS OF AMENDMENTS

No amendments or other filings were submitted in response to the final rejection mailed August 17, 2010. A notice of appeal was timely filed on October 25, 2010.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

In recent years the CRT display monitors on cart-borne ultrasound systems, the prevalent form in which ultrasound systems are configured, are being replaced by flat panel displays. Since flat panel displays are much lighter than the heavy glass CRT monitors which preceded them, flat panel displays lend themselves to easier and more versatile adjustment so as to be more comfortable for viewing by the sonographer. To provide high versatility and ease of use, a number of design objectives can be pursued simultaneously. The flat panel display should have a wide range of adjustable positioning for viewing. Its weight should be neutrally offset so that the display is adjustable with the touch of a finger. When the sonographer has adjusted the display to face him or her, the display orientation toward the sonographer should remain constant as the display is subsequently raised or lowered. Finally, the display must be safely and securely stowed whenever the cart-mounted ultrasound system is wheeled to another room or floor of a hospital to prevent damage to the display, the ultrasound system, or injury to an operator.

An ultrasound system of the present invention satisfies all of these design objectives. A flat panel display is connected to an articulating arm assembly which enables the display to be adjusted laterally and in elevation. The assembly includes two movable arms, one connected to

the cart-borne ultrasound system and the other to the display. One of the arms includes a 4-bar linkage which allows the adjustment of the display up or down while maintaining the orientation of its tilt toward the sonographer. A piston inside the linkage provides a counter-weight force which offsets most of the weight of the flat panel display, allowing the display to be easily maneuvered and adjusted by the fingers of the sonographer. The articulating arms have an inter-arm locking mechanism located on the two arm which is adapted to lock the two arms together in a stowed position when the two arms are lowered in line with the direction of travel. In this position the flat panel display is safely locked down on the cart when in the stowed position. Since the arms are lowered in line with the direction of travel, the display is well balanced during transport of the cart. With the articulating arms locked together in their stowed position, the cart can be safely transported without injury to the sonographer or damage to the flat panel display or ultrasound system.

Claim 1 is supported by the drawings and specification as seen by reference numerals (#) of the drawings and the specification text by page and line number (pg., ln) of the filed application as follows:

1. An ultrasonic diagnostic imaging system comprising:
a main body {#12; pg. 11, ln 11-37; pg. 12, Claim 1}housing imaging electronics and a control panel {#18; pg. 11, ln 11-37} coupled to the imaging electronics;
a flat panel display {#40; pg. 11, ln 11-37; pg. 12, Claim 1}

electrically coupled to the imaging electronics;

a wheeled cart {#14; pg. 11, ln 11-37; pg. 15-16, Claim 18} on which is mounted the main body and the flat panel display with the control panel on the front, the wheeled cart being adapted so that the cart can travel in the front direction; and

an articulating arm assembly to {#50; pg. 3, ln 22 to pg. 4, ln 14}which the flat panel display is connected for adjusting the elevation and lateral position of the flat panel display with respect to the main body, the articulating arm assembly including a first arm {#52; pg. 4, ln 15-26} movably mounted to the main body and a second arm {#54; pg. 4, ln 27 to pg. 5, ln 4} movably connected to the first arm and to the flat panel display, wherein at least one of the arms includes a 4-bar linkage {#70; pg. 5, ln 5-22} containing a piston {#56; pg. 5, ln 23 to pg. 6, ln 11} inside the linkage; and

an inter-arm locking mechanism {#92, #94; pg. 6, ln 25 to pg. 7, ln 6}, located on the first and second arms, which is adapted to lock the two arms together in a stowed position {Fig. 8c; pg. 9, ln 18-23} when the two arms are lowered in line with the direction of travel.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether Claims 1, 3-4, and 6-14 were correctly rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. 5,924,988 (Burris et al.) in view of US Pat. 6,663,569 (Wilkins et al.) and further in view of US Pat. 5,363,116 (Allen)

VII. ARGUMENT

Whether Claims 1, 3-4, and 6-14 were correctly rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. 5,924,988 (Burris et al.) in view of US Pat. 6,663,569 (Wilkins et al.) and further in view of US Pat. 5,363,116 (Allen)

Burris et al. was cited for its showing of two articulated arms for mounting a flat panel display in Fig. 5. However, Burris et al. do not show or suggest an articulated arm with a 4-bar linkage, a piston inside the linkage, or an inter-arm locking mechanism, located on the two arms, which is adapted to lock the two arms together in a stowed position when the two arms are lowered in line with the direction of travel. The Examiner contends that the inter-arm locking mechanism is present in Burris et al., citing hinge 550 which joins arms 560 and 570 in Fig. 5 of Burris et al. While a hinge may join the arms together, it certainly provides no locking ability. The circular arrow located above the center line of the hinge 550 shows exactly the opposite, the full swiveling range of hinge 550. The vertical arrow behind the hinge 550 indicates its range of vertical elevation. There is nothing in the text of Burris et al. which attributes any locking function to hinge 550.

The Examiner also contends that a vertical arrow in Fig. 5 of Burris et al. indicates a stowed position. Once again, there is no basis in Burris et al. for the Examiner's reading. The text of Burris et al. says nothing at

all about the arrows. From their positioning it is obvious that they are meant to indicate the motional range or direction of different parts and joints of the Burris et al. assemblies. The "stowed position" reading is taken directly from applicants' Claim 1, as there is nothing in Burris et al. to support it.

This still leaves the 4-bar linkage arm and piston absent from Burris et al. To supply these, the Examiner cites Wilkins et al. which shows a single-arm 4-bar linkage and piston to support and change the elevation of an ultrasound system control panel. The Wilkins et al. assembly enables a control panel to be moved vertically. The Wilkins et al. assembly lacks the full range of articulation of the two arm assembly of the present invention. Furthermore the Wilkins et al. assembly is for a heavy control panel. There is no suggestion to use the Wilkins et al. assembly for a much lighter flat panel display. In fact, Wilkins et al. teach away from use of their assembly with a flat panel display, as their ultrasound system plainly shows a flat panel display 16 in Fig. 1 with not the slightest suggestion to apply their control panel lift to the flat panel display. Hence it is respectfully submitted that Wilkins et al. teaches away from the combination with Burris et al. for which the Examiner contends.

In the most recent final rejection, the Examiner has added the Allen patent for a tripod stand for a microwave dish antenna to Burris et al. and Wilkins et al. to provide the inter-arm locking mechanism now acknowledged to be missing from the previous combination. Why a designer of an articulating display for a cart-borne ultrasound system would look to a microwave antenna tripod stand as analogous art is unexplained, as the two are obviously unrelated. The Allen antenna stand has three legs pinned to a bracket 21 which slides up and down a central column 12. When the bracket is slid to the bottom position the ends of compression beams 20 are detachably pinned to the bracket to brace the tripod in the standing position in which the microwave antenna can be attached. When the assembly is to be packed up for moving, the pins are removed from the ends of the beams and bracket, the bracket is slid up the central column, and the pins are re-inserted in the bracket in its upward position to hold the legs 14 and the compression beams 20 folded against the column 12. This complexity and completely different functionality and purpose would be rejected by an ultrasound system designer, as doctors and nurses would not have the patience for such a mechanism. They would sooner move the cart-borne ultrasound system with the display still articulating than go through this process every time

the cart was to be moved, risking the safety of themselves and the ultrasound system.

Even if Allen were combinable with the other two references, it still falls short of satisfying the claim language. Claim 1 recites that the two articulating arms are locked together in a stowed position when the two arms are lowered in line with the direction of travel of the cart. The Allen tripod stand has no direction of travel. When it is set up it is stationary, and when it is folded, it may be moved in some way not mentioned by Allen. It may be moved when opened, for that matter. Since the Allen tripod has no definable direction of travel, it is respectfully submitted that the combination of Allen with Burris et al. and Wilkins et al. still cannot render Claim 1 and its dependent claims unpatentable.

For all of the foregoing reasons it is respectfully submitted that the control panel lift of Wilkins et al. cannot be combined with the flat panel articulation assemblies of Burris et al., and the microwave antenna tripod of Allen cannot be combined with either of them. Even if the combination could validly be made, the inter-arm locking mechanism for stowing the two arms when lowered in the direction of travel is completely absent from both Burris et al. and Wilkins et al., and is not found in Allen either.

Furthermore, the piston in the inventive flat panel articulation assembly is to counterbalance the weight of the display. In a constructed embodiment this counter-weight force occurs when the second arm is in a horizontal orientation. See Claims 11 and 12. The piston 60 in Wilkins et al. is a hydraulic piston which provides no counterbalance for the weight of the control panel. Instead, when the hydraulic valve is closed, the piston supports the control panel at whatever its current elevation is. In addition to their dependency from Claim 1, it is respectfully submitted that Claims 11 and 12 are patentable over Burris et al., Wilkins et al., and Allen for this further reason.

VIII. CONCLUSION

Based on the law and the facts, it is respectfully submitted that Claims 1, 3-4 and 6-14 are patentable over any combination of Burris et al., Wilkins et al. and Allen. Accordingly, it is respectfully requested that this Honorable Board reverse the grounds of rejection of Claims 1, 3-4 and 6-14 of this application which were stated in the August 17, 2010 Office action being appealed.

Respectfully submitted,

JOHN MURKOWSKI ET AL.

By: /W. Brinton Yorks, Jr./
W. Brinton Yorks, Jr.
Reg. No. 28,923

APPENDIX A: CLAIMS APPENDIX

The following Claims 1, 3-4 and 6-14 are the claims involved in this appeal.

1. (previously presented) An ultrasonic diagnostic imaging system comprising:

a main body housing imaging electronics and a control panel coupled to the imaging electronics;

a flat panel display electrically coupled to the imaging electronics;

a wheeled cart on which is mounted the main body and the flat panel display with the control panel on the front, the wheeled cart being adapted so that the cart can travel in the front direction; and

an articulating arm assembly to which the flat panel display is connected for adjusting the elevation and lateral position of the flat panel display with respect to the main body, the articulating arm assembly including a first arm movably mounted to the main body and a second arm movably connected to the first arm and to the flat panel display, wherein at least one of the arms includes a 4-bar linkage containing a piston inside the linkage; and

an inter-arm locking mechanism, located on the first and second arms, which is adapted to lock the two arms together in a stowed position when the two arms are lowered in line with the direction of travel.

2. (canceled)

3. (original) The ultrasonic diagnostic imaging system of Claim 1, wherein the second arm includes a 4-bar linkage.

4. (original) The ultrasonic diagnostic imaging

system of Claim 3, wherein the 4-bar linkage includes first and second pivot axes located at an end of the second arm which is connected to the first arm, and third and fourth pivot axes located at an end of the second arm which is connected to the flat panel display.

5. (canceled)

6. (previously presented) The ultrasonic diagnostic imaging system of Claim 1, wherein the locking mechanism further comprises a user-operated lock release which is operated to cause the locking of the two arms to be released.

7. (original) The ultrasonic diagnostic imaging system of Claim 1, wherein the articulating arm assembly further includes a first vertical pivot axis located at an end of the first arm which is movably mounted to the first body, and a second vertical pivot axis located at an end of the first arm which is connected to the second arm.

8. (original) The ultrasonic diagnostic imaging system of Claim 7, wherein the articulating arm assembly further includes a third vertical pivot axis located at an end of the second arm which is connected to the flat panel display, and a horizontal pivot axis located at the end of the second arm which is connected to the flat panel display.

9. (original) The ultrasonic diagnostic imaging system of Claim 7, wherein the arc of travel of the first arm about the first vertical pivot axis is constrained to be less than 360°, and wherein the arc of travel of the second arm about the second vertical axis is constrained to be less than 360°.

10. (previously presented) The ultrasonic

diagnostic imaging system of Claim 1, wherein the second arm includes a 4-bar linkage, and wherein the piston further comprises:

a pneumatic piston which acts to provide a force which at least partially offsets the weight of the flat panel display.

11. (original) The ultrasonic diagnostic imaging system of Claim 10, further comprising an adjustment mechanism, coupled to the pneumatic piston, which is operable to adjust the force provided by the pneumatic piston.

12. (original) The ultrasonic diagnostic imaging system of Claim 11, wherein the pneumatic piston is adjusted to provide a balancing counter-weight force when the second arm is oriented in a horizontal orientation.

13. (original) The ultrasonic diagnostic imaging system of Claim 1, wherein the first arm exhibits a fixed upward inclination from an end which is connected to the main body to a second end which is elevated above the connection to the main body, and the second arm includes a 4-bar linkage.

14. (original) The ultrasonic diagnostic imaging system of Claim 3, wherein the 4-bar linkage includes first and second upper bars coupled between the first and third pivot axes and third and fourth lower bars coupled between the second and fourth pivot axes,

wherein the first bar is rigidly connected to the second bar and the third bar is rigidly connected to the fourth bar.

15. - 20. (canceled)

APPENDIX B: EVIDENCE APPENDIX

None. No extrinsic evidence has been submitted in this case.

APPENDIX C: RELATED PROCEEDINGS APPENDIX

None. There are no related proceedings.